Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in this application:

Listing of Claims:

1. (Currently amended) An apparatus for use with an adaptive orthogonal frequency division-multiplexing (OFDM) system that uses multiple input multiple output (MIMO) structure to transmit OFDM signals from a plurality of ~~transmitters~~ transmitter antennas to a plurality of ~~receivers~~ receiver antennas, ~~the~~ at least one of the OFDM ~~signal~~ signals having an OFDM frame of a duration, the OFDM frame having data packets and a plurality of OFDM slots, each of the OFDM slots having a plurality of OFDM symbols that include a plurality of sub-carriers, the apparatus comprising:

a receiver that responds to receipt of the at least one OFDM signal by making a determination for a sub-carrier of the plurality of sub-carriers as to whether time diversity or spatial diversity should be used for subsequent ~~transmissions~~ transmission on the sub-carrier and ~~transmits~~ transmitting a feedback signal indicative of that determination, ~~an implementation of the time diversity resulting in a better robustness to counter signal fading than if the spatial diversity were implemented and an implementation of spatial diversity resulting in an increase in a rate of data packet transfer over that if the time diversity were implemented, because the~~ wherein OFDM data signals that are transmitted on the sub-carrier over multiple ones of the ~~transmitters~~ transmitter antennas are independent of each other for the spatial diversity and correspond to each other for the time diversity.

2. (Original) An apparatus as in claim 1, wherein the receiver includes a controller that makes the determination based on a comparison of a channel condition with a threshold, the channel condition being based on a frequency response channel matrix that is derived from OFDM symbols.

3. (Original) An apparatus as in claim 2, wherein the channel condition is based on a calculation of a smallest eigen value of the frequency response channel matrix.

4. (Original) An apparatus as in claim 2, wherein the channel condition is based on a determination of a smallest element in a diagonal of the frequency response channel matrix.

5. (Original) An apparatus as in claim 2, wherein the channel condition represents a ratio of largest and smallest eigen values of the channel matrix.

6. (Original) An apparatus as in claim 2, wherein the channel condition is based on one of three criteria selected from a group consisting of a calculation of smallest eigen values of the channel matrix, a smallest element in a diagonal of the channel matrix, and a ratio of largest and smallest eigen values of the channel matrix.

7. (Original) An apparatus as in claim 2, further comprising a channel estimator that forms the frequency response channel matrix.

8. (Currently amended) An apparatus as in claim 2, wherein the controller is configured to classify each sub-carrier of the plurality of sub-carriers into one of two groups in accordance with ~~the~~ a respective channel condition for that sub-carrier, one of the two groups being indicative of time diversity and the other of the two groups being indicative of spatial diversity~~, the controller being further configured to determine a modulation scheme on each of the classified sub-carriers based on an estimated ratio selected from a further group consisting of a carrier to interference ratio and a signal to noise ratio~~.

9. (Currently amended) An apparatus for use with an adaptive orthogonal frequency division-multiplexing (OFDM) system that uses multiple input multiple output (MIMO) structure to transmit OFDM signals from a plurality of ~~transmitters~~ transmitter antennas to a plurality of ~~receivers~~ receiver antennas, at least one of the OFDM ~~signal~~ signals having an OFDM frame of a duration, the OFDM frame having data packets and a plurality of OFDM slots, each of the OFDM slots having a plurality of OFDM symbols that include a plurality of sub-carriers, the apparatus comprising:

at least one controller configured and arranged to respond to a feedback signal, the feedback signal indicative of a determination for a sub-carrier of the plurality of sub-carriers as to whether time diversity or spatial diversity should be used for subsequent transmission on the sub-carrier, to direct an encoder to assign constellation points for the time diversity or the spatial diversity to ~~the sub-carriers~~ the sub-carrier ~~in accordance with a channel conditions as to classify each of the sub-carriers into one of two groups~~, the encoder including a space time transmitter diversity (STTD) encoder and

a spatial multiplexing (SM) encoder, the STTD encoder being arranged to encode the ~~sub-carriers classified in one of the groups~~ sub-carrier in accordance with the time diversity and the SM encoder being arranged to encode the ~~sub-carriers classified in the other of the groups~~ sub-carrier in accordance with the spatial diversity, ~~an implementation of the time diversity resulting in a better robustness to counter signal fading than if the spatial diversity were implemented and an implementation of spatial diversity resulting in an increase in a rate of data packet transfer over that if the time diversity were implemented,~~ ~~because the~~ wherein OFDM data signals that are transmitted on the sub-carrier over multiple ones of the ~~transmitters~~ transmitter antennas are independent of each other for the spatial diversity and correspond to each other for the time diversity.

10. (Original) An apparatus as in claim 9, wherein the controller is configured to determine a modulation scheme on each of the sub-carriers based on an estimated ratio selected from a further group consisting of a carrier to interference ratio and a signal to noise ratio.

11. (Currently amended) An apparatus for use with an adaptive orthogonal frequency division multiplexing (OFDM) system that uses multiple input multiple output (MIMO) structure to transmit OFDM signals from a plurality of ~~transmitters~~ transmitter antennas to a plurality of ~~receivers~~ receiver antennas, at least one of the OFDM ~~signal~~ signals having an OFDM frame of a duration, the OFDM frame having data packets and a

plurality of OFDM slots, each of the OFDM slots having a plurality of OFDM symbols that include a plurality of sub-carriers, the apparatus comprising:

controllers configured and arranged to direct transmission and reception in accordance with OFDM, the controllers including those associated with the reception that are configured to ~~responds~~ respond to receipt of the at least one OFDM signal by making a determination for a sub-carrier of the plurality of sub-carriers as to whether time diversity or spatial diversity should be used for subsequent ~~transmissions~~ transmission on the sub-carrier and ~~transmits~~ transmitting a feedback signal indicative of that determination, ~~an implementation of the time diversity resulting in a better robustness to counter signal fading than if the spatial diversity were implemented and an implementation of spatial diversity resulting in an increase in a rate of data packet transfer over that if the time diversity were implemented, because the~~ wherein OFDM data signals that are transmitted on the sub-carrier over multiple ones of the ~~transmitters~~ transmitter antennas are independent of each other for the spatial diversity and correspond to each other for the time diversity, ~~the controllers associated with the reception being configured to direct that transmission of at least one feedback signal occur that reflects the determination,~~ the controllers including those associated with the transmission that are responsive to receipt of the feedback signal to direct an encoder to assign constellation points for either the time diversity or the spatial diversity to the ~~sub-carriers~~ sub-carrier ~~in accordance with a channel condition so as to classify each of the sub-carriers into one of two groups~~, the encoder including a space time transmitter diversity (STTD) encoder and a spatial multiplexing (SM) encoder, the STTD encoder being arranged to encode the ~~sub-carriers classified in one of the groups~~ sub-carrier in

accordance with the time diversity and the SM encoder being arranged to encode the ~~sub-carriers classified in the other of the groups~~ sub-carrier in accordance with the spatial diversity.

12. (Currently amended) An apparatus as in claim 11, wherein the ~~controller is~~ controllers are configured to determine a modulation scheme on each of the sub-carriers based on an estimated ratio selected from a further group consisting of a carrier to interference ratio and a signal to noise ratio.

13. (Currently amended) An apparatus as in claim 12, wherein the controllers associated with the reception are configured to make a calculation of eigen values of channel matrices to make a determination as to which sub-carriers are to use the time diversity ~~to reduce signal fading forward error correction (FEC)~~ during a subsequent transmission and which sub-carriers are to use the spatial diversity ~~to increase a rate of data transfer~~ during the subsequent transmission, the controllers associated with the reception being configured to make the determination based on a comparison between a threshold and ~~at least one of three criteria~~ the eigen values and to direct transmission of a feed back signal indicative of a result of the determination~~, at least one of the criteria being based on the calculation, at least another of the criteria being based on elements of a diagonal of at least one of the channel matrices~~.

14. (Currently amended) An apparatus as in claim [12] 11, wherein the controllers associated with the reception are configured [[so]] to make the determination

based on a comparison of a channel condition with a threshold, the channel condition being based on a frequency response channel matrix that is derived from OFDM symbols.

15. (Original) An apparatus as in claim 14, wherein the channel condition represents a calculation of a smallest eigen value of the frequency response channel matrix.

16. (Original) An apparatus as in claim 14, wherein the channel condition represents a determination of a smallest element in a diagonal of the frequency response channel matrix.

17. (Original) An apparatus as in claim 14, wherein the channel condition represents a ratio of largest and smallest eigen values of the channel matrix.

18. (Original) An apparatus as in claim14, wherein the channel condition represents one of three criteria selected from a group consisting of a calculation of smallest eigen values of the channel matrix, a smallest element in a diagonal of the channel matrix, and a ratio of largest and smallest eigen values of the channel matrix.

19. (Original) An apparatus as in claim 14, further comprising a channel estimator that forms the frequency response channel matrix.

20. (Currently amended) A method for use with an adaptive orthogonal frequency division-multiplexing (OFDM) system that uses multiple input multiple output (MIMO) structure to transmit OFDM signals from a plurality of ~~transmitters~~ transmitter antennas to a plurality of ~~receivers~~ receiver antennas, at least one of the OFDM ~~signal~~ signals having an OFDM frame of a duration, the OFDM frame having data packets and a plurality of OFDM slots, each of the OFDM slots having a plurality of OFDM symbols that include a plurality of sub-carriers, the method comprising:

responding to receipt of the OFDM signal by making a determination for a sub-carrier of the plurality of sub-carriers as to whether time diversity or spatial diversity should be used for subsequent ~~transmissions~~ transmission on the sub-carrier and ~~transmits~~ transmitting a feedback signal indicative of that determination, ~~an implementation of the time diversity resulting in a better robustness to counter signal fading than if the spatial diversity were implemented and an implementation of spatial diversity resulting in an increase in a rate of data packet transfer over that if the time diversity were implemented, because the~~ wherein OFDM data signals that are transmitted on the sub-carrier over multiple ones of the ~~transmitters~~ transmitter antennas are independent of each other for the spatial diversity and correspond to each other for the time diversity.

21. (Original) A method as in claim 20, further comprising making the determination based on a comparison of a channel condition with a threshold, the channel condition being based on a frequency response channel matrix that is derived from OFDM symbols.

22. (Currently amended) A method as in claim 21, further comprising calculating a smallest eigen value of the frequency response channel matrix and basing the channel condition on the calculating.

23. (Currently amended) [[An]] A method as in claim 21, further comprising determining a smallest element in a diagonal of the frequency response channel matrix and basing the channel condition on the determining.

24. (Original) A method as in claim 21, further comprising calculating a ratio of largest and smallest eigen values of the channel matrix and basing the channel condition on the ratio.

25. (Original) A method as in claim 21, further comprising basing the channel condition on one of three criteria selected from a group consisting of a calculation of smallest eigen values of the channel matrix, a smallest element in a diagonal of the channel matrix, and a ratio of largest and smallest eigen values of the channel matrix.

26. (Currently amended) A method as in claim 20, further comprising classifying ~~the~~ each sub-carrier of the plurality of sub-carriers into one of two groups in accordance with a respective channel condition for that sub-carrier, one of the two groups being indicative of time diversity and the other of the two groups being indicative of spatial diversity~~, determining a modulation scheme on each of the classified sub-carriers based~~

~~on an estimated ratio selected from a further group consisting of carrier to interference ratio and signal to noise ratio~~.

27. (Currently amended) A method for use with an adaptive orthogonal frequency division-multiplexing (OFDM) system that uses multiple input multiple output (MIMO) structure to transmit OFDM signals from a plurality of ~~transmitters~~ transmitter antennas to a plurality of ~~receivers~~ receiver antennas, at least one of the OFDM ~~signal~~ signals having an OFDM frame of a duration, the OFDM frame having data packets and a plurality of OFDM slots, each of the OFDM slots having a plurality of OFDM symbols that include a plurality of sub-carriers, the method comprising:

responding to a feedback signal, the feedback signal indicative of a determination for a sub-carrier of the plurality of sub-carriers as to whether time diversity or spatial diversity should be used for subsequent transmission on the sub-carrier, to direct an encoder to assign constellation points for the time diversity or the spatial diversity to ~~the sub-carriers~~ the sub-carrier ~~in accordance with a channel condition so as to classify each of the sub-carriers into one of two groups~~, the encoder including a space time transmitter diversity (STTD) encoder and a spatial multiplexing (SM) encoder, the STTD encoder being arranged to encode the ~~sub-carriers classified in one of the groups~~ sub-carrier in accordance with the time diversity and the SM encoder being arranged to encode the ~~sub-carriers classified in the other of the groups~~ sub-carrier in accordance with the spatial diversity, ~~an implementation of the time diversity resulting in a better robustness to counter signal fading than if the spatial diversity were implemented and an implementation of spatial diversity resulting in an increase in a rate of data packet~~

~~transfer over that if the time diversity were implemented, because the~~ wherein OFDM data signals that are transmitted on the sub-carrier over multiple ones of the ~~transmitters~~ transmitter antennas are independent of each other for the spatial diversity and correspond to each other for the time diversity.

28. (Currently amended) A method as in claim 27, further comprising classifying ~~the~~ each sub-carrier of the plurality of sub-carriers into one of two groups in accordance with a respective channel condition for that sub-carrier, one of the two groups being indicative of time diversity and the other of the two groups being indicative of spatial diversity~~, determining a modulation scheme on each of the classified sub-carriers based on an estimated ratio selected from a further group consisting of a carrier to interference ratio and a signal to noise ratio~~.

29. (Currently amended) A method for use with an adaptive orthogonal frequency division-multiplexing (OFDM) system that uses multiple input multiple output (MIMO) structure to transmit OFDM signals from a plurality of ~~transmitters~~ transmitter antennas to a plurality of ~~receivers~~ receiver antennas, at least one of the OFDM ~~signal~~ signals having an OFDM frame of a duration, the OFDM frame having data packets and a plurality of OFDM slots, each of the OFDM slots having a plurality of OFDM symbols that include a plurality of sub-carriers, the method comprising:

directing transmission and reception in accordance with OFDM by using controllers, the controllers including those associated with the reception responding to receipt of the at least one OFDM signal by making a determination for a sub-carrier of

the plurality of sub-carriers as to whether time diversity or spatial diversity should be used for subsequent ~~transmissions~~ transmission on the sub-carrier and ~~transmits~~ transmitting a feedback signal indicative of that determination, ~~an implementation of the time diversity resulting in a better robustness to counter signal fading than if the spatial diversity were implemented and an implementation of spatial diversity resulting in an increase in a rate of data packet transfer over that if the time diversity were implemented, because the~~ wherein OFDM data signals that are transmitted on the sub-carrier over multiple ones of the ~~transmitters~~ transmitter antennas are independent of each other for the spatial diversity and correspond to each other for the time diversity, ~~the controllers associated with the reception directing that transmission of at least one feedback signal occur that reflects the determination,~~ the controllers including those associated with the transmission that respond to receipt of the feedback signal to direct an encoder to assign constellation points for the time diversity or the spatial diversity to the ~~sub-carriers~~ sub-carrier ~~in accordance with a channel condition so as to classify each of the sub-carriers into one of two groups~~, the encoder including a space time transmitter diversity (STTD) encoder and a spatial multiplexing (SM) encoder, the STTD encoder being arranged to encode the ~~sub-carriers classified in one of the groups~~ sub-carrier in accordance with the time diversity and the SM encoder being arranged to encode the ~~sub-carriers classified in the other of the groups~~ sub-carrier in accordance with the spatial diversity.

30. (Currently amended) A method as in claim 29, wherein the controllers associated with the reception make a calculation of eigen values of channel matrices to make a determination as to which sub-carriers are to use the time diversity ~~to reduce~~

~~signal fading forward error correction (FEC)~~ during a subsequent transmission and which sub-carriers are to use the spatial diversity ~~to increase a rate of data transfer~~ during the subsequent transmission, the controllers associated with the reception make the determination based on a comparison between a threshold and ~~at least one of three criteria~~ the eigen values and [[to]] direct transmission of a feed back signal indicative of a result of the determination~~, at least one of the criteria being based on the calculation, at least another of the criteria being based on elements of a diagonal of at least one of the channel matrices~~.

31. (Original) A method as in claim 29, wherein the controllers associated with the reception make the determination based on a comparison of a channel condition with a threshold, the channel condition being based on a frequency response channel matrix that is derived from OFDM symbols.

32. (Original) A method as in claim 31, further comprising calculating a smallest eigen value of the frequency response channel matrix basing the channel condition on the calculating.

33. (Original) A method as in claim 31, further comprising determining a smallest element in a diagonal of the frequency response channel matrix and basing the channel condition on the determining.

34. (Original) A method as in claim 31, further comprising calculating a ratio of largest and smallest eigen values of the channel matrix and basing the channel condition on the ratio.

35. (Original) A method as in claim 31, further comprising basing the channel condition on one of three criteria selected from a group consisting of a calculation of smallest eigen values of the channel matrix, a smallest element in a diagonal of the channel matrix, and a ratio of largest and smallest eigen values of the channel matrix.

36. (Original) A method as in claim 29, further comprising determining a modulation scheme on each of the sub-carriers based on an estimated ratio selected from a further group consisting of a carrier to interference ratio and a signal to noise ratio.

37. (New) An apparatus as in claim 2, wherein the controller is further configured to determine a modulation scheme on each of the plurality of sub-carriers based on an estimated ratio selected from a group consisting of a carrier to interference ratio and a signal to noise ratio.

38. (New) A method as in claim 20, further comprising determining a modulation scheme on each of the plurality of sub-carriers based on an estimated ratio selected from a group consisting of carrier to interference ratio and signal to noise ratio.

39. (New) A method as in claim 27, further comprising determining a modulation scheme on each of the plurality of sub-carriers based on an estimated ratio selected from a group consisting of a carrier to interference ratio and a signal to noise ratio.

40. (New) An apparatus as in claim 1, wherein the subsequent transmission comprises transmission units comprising M OFDM symbols, where M is the number of transmitter antennas in the OFDM system.

41. (New) An apparatus as in claim 9, wherein the subsequent transmission comprises transmission units comprising M OFDM symbols, where M is the number of transmitter antennas in the OFDM system.

42. (New) An apparatus as in claim 11, wherein the subsequent transmission comprises transmission units comprising M OFDM symbols, where M is the number of transmitter antennas in the OFDM system.

43. (New) A method as in claim 20, further comprising using transmission units comprising M OFDM symbols for the subsequent transmission, where M is the number of transmitter antennas in the OFDM system.

44. (New) A method as in claim 27, further comprising using transmission units comprising M OFDM symbols for the subsequent transmission, where M is the number of transmitter antennas in the OFDM system.

45. (New) A method as in claim 29, further comprising using transmission units comprising M OFDM symbols for the subsequent transmission, where M is the number of transmitter antennas in the OFDM system.

46. (New) An apparatus as in claim 1, wherein the receiver makes a calculation of eigen values of a plurality of channel matrices to make a determination as to which sub-carriers are to use the time diversity during a subsequent transmission and which sub-carriers are to use the spatial diversity during the subsequent transmission, the receiver being configured to make the determination based on a comparison between a threshold and the eigen values and to direct transmission of a feed back signal indicative of a result of the determination.

47. (New) A method as in claim 20, further comprising calculating eigen values of a plurality of channel matrices to make a determination as to which sub-carriers are to use the time diversity during a subsequent transmission and which sub-carriers are to use the spatial diversity during the subsequent transmission, wherein the determination is made based on a comparison between a threshold and the eigen values, and transmitting a feed back signal indicative of a result of the determination.

48. (New) An apparatus as in claim 1, wherein the receiver responds to receipt of the at least one OFDM signal by designating each of the plurality of sub-carriers as an element of one of two sets, wherein one set is for sub-carriers that should use time diversity for subsequent transmission and the other set is for sub-carriers that should use spatial diversity for subsequent transmission, and transmitting the set with fewer elements as the feedback signal.

49. (New) An apparatus as in claim 9, wherein the feedback signal indicates either a set of sub-carriers of the plurality of sub-carriers that should use time diversity for subsequent transmission or a set of sub-carriers of the plurality of sub-carriers that should use spatial diversity for subsequent transmission depending on which set has fewer elements.

50. (New) An apparatus as in claim 11, wherein the controllers associated with the reception respond to receipt of the at least one OFDM signal by designating each of the plurality of sub-carriers as an element of one of two sets, wherein one set is for sub-carriers that should use time diversity for subsequent transmission and the other set is for sub-carriers that should use spatial diversity for subsequent transmission, and transmitting the set with fewer elements as the feedback signal.

51. (New) A method as in claim 20, wherein responding to receipt of the at least one OFDM signal comprises designating each of the plurality of sub-carriers as an element of one of two sets, wherein one set is for sub-carriers that should use time

diversity for subsequent transmission and the other set is for sub-carriers that should use spatial diversity for subsequent transmission, and transmitting the set with fewer elements as the feedback signal.

52. (New) A method as in claim 27, wherein the feedback signal indicates either a set of sub-carriers of the plurality of sub-carriers that should use time diversity for subsequent transmission or a set of sub-carriers of the plurality of sub-carriers that should use spatial diversity for subsequent transmission depending on which set has fewer elements.

53. (New) A method as in claim 29, wherein responding to receipt of the at least one OFDM signal comprises designating each of the plurality of sub-carriers as an element of one of two sets, wherein one set is for sub-carriers that should use time diversity for subsequent transmission and the other set is for sub-carriers that should use spatial diversity for subsequent transmission, and transmitting the set with fewer elements as the feedback signal.

54. (New) An apparatus as in claim 1, wherein the receiver responds to receipt of the OFDM signal by making a determination for a subset of the plurality of sub-carriers as to whether time diversity or spatial diversity should be used for subsequent transmission on the subset of the sub-carriers.

55. (New) An apparatus as in claim 9, wherein at least one controller is configured and arranged to respond to a feedback signal, the feedback signal indicative of a determination for a subset of the plurality of sub-carriers as to whether time diversity or spatial diversity should be used for subsequent transmission on the subset of the sub-carriers, to direct an encoder to assign constellation points for the time diversity or the spatial diversity to the subset of the sub-carriers.

56. (New) An apparatus as in claim 11, wherein the controllers including those associated with the reception that are configured to respond to receipt of the at least one OFDM signal by making a determination for a subset of the plurality of sub-carriers as to whether time diversity or spatial diversity should be used for subsequent transmission on the subset of the sub-carriers.

57. (New) A method as in claim 20, wherein the responding comprises responding to receipt of the OFDM signal by making a determination for a subset of the plurality of sub-carriers as to whether time diversity or spatial diversity should be used for subsequent transmission on the sub-carrier.

58. (New) A method as in claim 27, wherein the responding comprises responding to a feedback signal, the feedback signal indicative of a determination for a subset of the plurality of sub-carriers as to whether time diversity or spatial diversity should be used for subsequent transmission on the subset of the sub-carriers, to direct an

encoder to assign constellation points for the time diversity or the spatial diversity to the subset of the sub-carriers.

59. (New) A method as in claim 29, wherein the controllers including those associated with the reception respond to receipt of the at least one OFDM signal by making a determination for a subset of the plurality of sub-carriers as to whether time diversity or spatial diversity should be used for subsequent transmission on the subset of the sub-carriers.

60. (New) An apparatus as in claim 1, wherein the receiver responds to receipt of the OFDM signal by making a determination for sub-carriers of an OFDM symbol from the plurality of OFDM symbols as to whether time diversity or spatial diversity should be used for subsequent transmission on the sub-carriers of the OFDM symbol.

61. (New) An apparatus as in claim 9, wherein at least one controller is configured and arranged to respond to a feedback signal, the feedback signal indicative of a determination for sub-carriers of an OFDM symbol from the plurality of OFDM symbols as to whether time diversity or spatial diversity should be used for subsequent transmission on the sub-carriers of the OFDM symbol, to direct an encoder to assign constellation points for the time diversity or the spatial diversity to the sub-carriers of the OFDM symbol.

62. (New) An apparatus as in claim 11, wherein the controllers including those associated with the reception that are configured to respond to receipt of the at least one OFDM signal by making a determination for sub-carriers of an OFDM symbol from the plurality of OFDM symbols as to whether time diversity or spatial diversity should be used for subsequent transmission on the sub-carriers of the OFDM symbol.

63. (New) A method as in claim 20, wherein the responding comprises responding to receipt of the OFDM signal by making a determination for sub-carriers of an OFDM symbol from the plurality of OFDM symbols as to whether time diversity or spatial diversity should be used for subsequent transmission on the sub-carrier.

64. (New) A method as in claim 27, wherein the responding comprises responding to a feedback signal, the feedback signal indicative of a determination for sub-carriers of an OFDM symbol from the plurality of OFDM symbols as to whether time diversity or spatial diversity should be used for subsequent transmission on the sub-carriers of the OFDM symbol, to direct an encoder to assign constellation points for the time diversity or the spatial diversity to the sub-carriers of the OFDM symbol.

65. (New) A method as in claim 29, wherein the controllers including those associated with the reception respond to receipt of the at least one OFDM signal by making a determination for sub-carriers of an OFDM symbol from the plurality of OFDM symbols as to whether time diversity or spatial diversity should be used for subsequent transmission on the sub-carriers of the OFDM symbol.

66. (New) A method for use with an adaptive orthogonal frequency division-multiplexing (OFDM) system that uses multiple input multiple output (MIMO) structure to transmit OFDM signals from a plurality of transmitter antennas to a plurality of receiver antennas, at least one of the OFDM signals having an OFDM frame of a duration, the OFDM frame having data packets and a plurality of OFDM slots, each of the OFDM slots having a plurality of OFDM symbols that include a plurality of sub-carriers, the method comprising:

responding to receipt of the OFDM signal by making a determination as to whether time diversity or spatial diversity should be used for subsequent transmission and transmitting a feedback signal indicative of that determination, wherein OFDM data signals that are transmitted over multiple ones of the transmitter antennas are independent of each other for the spatial diversity and correspond to each other for the time diversity and wherein the determination is based on a channel condition indicated by a criteria selected from the group of criteria consisting of an eigen value of a channel matrix, an element in a diagonal of the channel matrix and a plurality of eigen values of the channel matrix.

67. (New) A method for use with an adaptive orthogonal frequency division-multiplexing (OFDM) system that uses multiple input multiple output (MIMO) structure to transmit OFDM signals from a plurality of transmitter antennas to a plurality of receiver antennas, at least one of the OFDM signals having an OFDM frame of a duration, the OFDM frame having data packets and a plurality of OFDM slots, each of

the OFDM slots having a plurality of OFDM symbols that include a plurality of sub-carriers, the method comprising:

responding to a feedback signal to direct an encoder to assign constellation points for time diversity or spatial diversity to at least one sub-carrier of the plurality of sub-carriers in accordance with a channel condition, the encoder including a space time transmitter diversity (STTD) encoder and a spatial multiplexing (SM) encoder, the STTD encoder being arranged to encode the at least one sub-carrier in accordance with time diversity and the SM encoder being arranged to encode the at least one sub-carrier in accordance with spatial diversity, wherein OFDM data signals that are transmitted over multiple ones of the transmitter antennas are independent of each other for the spatial diversity and correspond to each other for the time diversity and wherein the channel condition is determined based on a criteria selected from the group of criteria consisting of an eigen value of a channel matrix, an element in a diagonal of the channel matrix and a plurality of eigen values of the channel matrix.